

REMARKS

Claim 22 has been canceled. Claims 1-21 and 23 are present in the application. In view of the remarks that follow, Applicants respectfully request reconsideration of the application.

Information Disclosure Statement

As a courtesy to the Examiner, Applicants wish to notify the Examiner that, concurrently with the filing of this Response, Applicants are also filing a Second Information Disclosure Statement (IDS). The IDS should arrive at the Examiner's desk with this Response. However, in the event that this Response arrives before the IDS, the Examiner will be aware of the IDS and can take action to locate it. The IDS is accompanied by a check that covers the fee needed for submission of an IDS at this point in the examination process.

Dependent Claim 22

The Examiner raised an objection to dependent Claim 22, and proposed an appropriate correction. However, the proposed amendment to Claim 22 would have caused Claim 22 to be identical to Claim 23. Accordingly, in order to avoid having two identical claims, Claim 22 has been canceled.

Independent Claim 1 - Sakaguchi and Henley

Independent Claim 1 stands rejected under 35 USC §103 as obvious in view of a proposed combination of teachings from Sakaguchi U.S. Patent No. 6,221,738 and newly-cited Henley U.S. Patent No. 6,013,563. This ground of rejection is respectfully traversed. In this regard, the PTO recognizes in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not

produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that the teachings drawn from Sakaguchi and Henley fail to establish a prima facie case of obviousness under §103 with respect to Claim 1, for the mutually exclusive reasons that are discussed below.

SAKAGUCHI DOES NOT TEACH WHAT THE OFFICE ACTION SAYS IT DOES

The limitations of independent Claim 1 include a recitation of:

providing a first wafer with a surface comprising of a first semiconductor layer of a first natural lattice constant;
forming a second semiconductor layer with a second natural lattice constant on the first semiconductor layer, with a strain gradient introduced at the interface of said second semiconductor layer and said first semiconductor layer; . . . and
performing a water jet cleaving procedure at said strain gradient so that said second semiconductor layer is separated from said first semiconductor layer and said first wafer.

The present Office Action relies on the embodiment of Figures 4A-4D of Sakaguchi, and asserts that two layers 102 and 103 thereof have different lattice constants that inherently produce a strain gradient, such that separation can be effected by introducing an external force at the strain gradient. In more detail, at lines 3-8 and 14-16 on page 3, the Office Action refers to lines 51-54 in column 25 of Sakaguchi, and asserts that Sakaguchi discloses the use of an external force at a strain gradient to cleave two portions of a device. However, this is not what is taught by the

indicated portion of Sakaguchi. More specifically, the indicated portion of Sakaguchi (at lines 51-54 in column 25) states that:

The bonded wafers as a composite member consisting of the bonded two substrate members were separated by the application of an external force to divide them by the second porous layer having a higher porosity. (Emphasis added).

In other words, the Office Action is relying on a portion of Sakaguchi that does not teach separation due to a strain caused by differing lattice constants. Instead, Sakaguchi teaches a different approach that involves the provision of a layer made of a porous material, and the application of a force to the porous layer in order to effect a separation. Thus, the indicated portion of Sakaguchi does not teach what the Office Action says it does, but instead teaches separation due to the presence of a layer with a high porosity. Accordingly, it is respectfully submitted that Sakaguchi fails to fulfill its intended role in the §103 rejection, and that the §103 rejection is therefore defective. For this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by the proposed combination of Sakaguchi and Henley.

PTO CANNOT ESTABLISH OBVIOUSNESS WITH ART THAT TEACHES AWAY

In evaluating obviousness, it is not proper to selectively consider only part of a reference, while ignoring other parts that teach away from the invention. In this regard, the provisions of MPEP §2141.02 specify that:

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. (Emphasis in original).

In the present situation, and as noted above, the Office Action relies on the embodiment of Figures 4A-4D of Sakaguchi, and asserts that two layers 102 and 103 thereof have different lattice constants that inherently produce a strain gradient, such that separation can be effected by introducing an external force at the strain gradient. However, as noted above, Sakaguchi actually teaches a different approach that involves the provision of a layer made of a porous material, and the application of a force to the porous layer in order to effect a separation. The basic message of Sakaguchi is that this "porosity" approach is superior to the use of differing lattice constants. For example, Sakaguchi states at lines 55-61 of column 11 that Sakaguchi's porosity approach is superior because it:

. . . allows the transfer of an Si layer of excellent crystallinity or a non-porous single-crystal compound semiconductor layer onto the insulating surface of an economically excellent substrate having a large area, while sufficiently suppressing cracks resulting from a difference in lattice constant or in thermal expansion coefficient, which is a problem encountered by conventional methods

Sakaguchi thus teaches directly away from the use of lattice constants, in favor of the porosity approach. As noted above, the Office Action relies on a portion of Sakaguchi that utilizes this porosity approach to effect separation. In particular, the Office Action relies on the portion of Sakaguchi at lines 51-54 in column 25, which states that:

The bonded wafers as a composite member consisting of the bonded two substrate members were separated by the application of an external force to divide them by the second porous layer having a higher porosity. (Emphasis added).

In other words, the Office Action is relying on a portion of Sakaguchi that does not teach separation due to a strain caused by differing lattice constants, but that instead teaches separation due to the presence of a layer with a high porosity. This reflects the fact that, as discussed above, Sakaguchi expressly teaches away from the use of differing lattice constants. The Office Action does not assert that the Henley patent has any relevant teachings regarding lattice constants, and in fact Henley does not appear to even mention "lattice constants".

Since it is well recognized that teaching away from the claimed invention is a per se demonstration of lack of prima facie obviousness, it is respectfully submitted that Sakaguchi and Henley do not factually support a prima facie case of obviousness with respect to Claim 1. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 1 is not obvious under §103 in view of Sakaguchi and Henley.

THE COMBINATION OF REFERENCES IS IMPROPER

There is yet another independent and compelling reason why the teachings drawn from Sakaguchi and Henley cannot properly be combined under §103 to reject Claim 1. In this regard, MPEP §2142 provides that:

To reach a proper determination under §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. . . . Knowledge of applicant's disclosure must be put aside in reaching this determination, . . . impermissible hindsight must be avoided, and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

In addition, MPEP §2143.01 provides that:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.
(Emphasis in original).

Here, there would be no motivation for a person of ordinary skill in the art to combine Sakaguchi and Henley in the proposed manner, because Henley has no teachings at all that would suggest the use of differing lattice constants to facilitate a separation of two layers, and Sakaguchi teaches directly away from the use of differing lattice constants, in favor of a significantly different approach that involves use of a porous layer. In fact, Sakaguchi would motivate a person not to use lattice constants when attempting to combine teachings from Sakaguchi and Henley. Therefore, the §103 rejection of Claim 1 is incomplete, because it does not properly establish the required motivation for combining Sakaguchi and Henley in the proposed manner, so as to use lattice constants even though Sakaguchi teaches not to do so. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 in view of Sakaguchi and Henley.

In view of the various different reasons discussed above, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by Sakaguchi and Henley. Claim 1 is thus believed to be allowable over Sakaguchi and Henley, and notice to that effect is respectfully requested.

Independent Claim 1 - Godbey and Henley

Independent Claim 1 further stands rejected under 35 USC §103 as obvious in view of a proposed combination of teachings from Godbey U.S. Patent No. 5,013,681 and the newly-cited Henley patent. This ground of rejection is respectfully traversed. In this regard, and as mentioned earlier, the PTO recognizes in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that the teachings drawn from Godbey and Henley fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 1, for the mutually exclusive reasons that are discussed below.

GODBEY DOES NOT TEACH WHAT THE OFFICE ACTION SAYS IT DOES

With reference to lines 8-15 on page 4 and lines 1-5 on page 5 of the Office Action, the Examiner asserts that Figures 9-12 of Godbey disclose two layers 72 and 74 with different lattice constants that inherently produce a strain gradient, such that separation can be effected by introducing an external force at the strain gradient. However, Godbey does not appear to contain anything teaching or suggesting that an external force is used to cleave two different portions of a device, much less due to a strain gradient between adjacent layers that have different lattice constants. Instead, Godbey teaches that excess material is removed from the device not by cleaving, but by etching and/or grinding/polishing. For example, lines 30-35 in column 4 state that the layer 20 in the embodiment of Figures 1-6 is removed by grinding, chemical polishing, and/or etching. And lines 46-50 in column 5 state that the process steps for the embodiment of Figures 9-12 are the same as for the embodiment of Figures 1-6. In other words, in Figures 9-12, excess material is removed from the device not by cleaving, but by etching and/or grinding/polishing. Thus, Godbey does not actually teach what the Office Action says it does. Accordingly, it is respectfully submitted that Godbey fails to fulfill its intended role in the §103 rejection, and that the §103 rejection is therefore defective. For this independent reason alone, it

is respectfully submitted that Claim 1 is not rendered obvious under §103 by the proposed combination of Godbey and Henley.

THE PRIOR ART MUST TEACH ALL CLAIM LIMITATIONS UNDER §103

The provisions of MPEP §2142 state that that:

To establish a *prima facie* case of obviousness, . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations.

As discussed above, neither Godbey nor Henley appears to disclose certain limitations that are expressly recited in Claim 1, including the limitations of Claim 1 that have been quoted above. Therefore, for this independent reason alone, it is respectfully submitted that Claim 1 is not obvious under §103 in view of Godbey and Henley, because Godbey and Henley do not together "teach or suggest all the claim limitations" (emphasis added), as required by §103 and MPEP §2142. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 1 is not obvious under §103 in view of Godbey and Henley.

THE COMBINATION OF REFERENCES IS IMPROPER

There is yet another independent and compelling reason why the teachings drawn from Godbey and Henley cannot properly be combined under §103 to reject Claim 1. In this regard, and as mentioned above, MPEP §2142 provides that:

To reach a proper determination under §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. . . . Knowledge of

applicant's disclosure must be put aside in reaching this determination, . . . impermissible hindsight must be avoided, and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

In addition, MPEP §2143.01 provides that:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.
(Emphasis in original).

Here, there would be no motivation for a person of ordinary skill in the art to combine Godbey and Henley in the proposed manner, because neither Godbey nor Henley appears to have any teachings at all that would suggest the use of differing lattice constants to facilitate a separation of two layers. Therefore, the §103 rejection of Claim 1 is incomplete, because it does not properly establish the required motivation for combining Godbey and Henley in the proposed manner. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 in view of Godbey and Henley, and notice to that effect is respectfully requested.

In view of the various different reasons discussed above, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by Godbey and Henley. Claim 1 is thus believed to be allowable over Godbey and Henley, and notice to that effect is respectfully requested.

Independent Claim 11

Independent Claim 11 stands rejected under 35 USC §103 as obvious in view of a proposed combination of teachings from Sarma U.S. Patent No. 5,344,524 and the newly-cited

Henley patent. This ground of rejection is respectfully traversed. In this regard, the PTO recognizes in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that the teachings drawn from Sarma and Henley fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 11, for the mutually exclusive reasons that are discussed below.

SARMA DOES NOT TEACH WHAT THE OFFICE ACTION SAYS IT DOES

The limitations of Claim 11 include a recitation of:

providing a first wafer with a surface comprising of a first semiconductor material of a first natural lattice constant;

forming a second semiconductor layer with a second natural lattice constant on the first semiconductor material so that said second semiconductor layer is strained, and with a large strain gradient formed at the interface of said second semiconductor layer and said first semiconductor material; . . .

performing a compressed air or pressurized fluid cleaving procedure at said strain gradient so that said second semiconductor layer is separated from said first semiconductor material

With reference to lines 9-15 on page 6 and lines 5-6 on page 7, the Office Action asserts that Figure 5 of Sarma discloses two layers 21 and 23 that have different lattice constants, and that therefore inherently have a strain gradient between them, such that separation can be effected by introducing an external force. However, this is not what Sarma teaches. More specifically, Sarma does not appear to contain anything that teaches or suggests that an external force is used to cleave two different portions of a device, much less due to adjacent layers that have different lattice constants. Instead, Figure 5 makes it very clear that excess material is removed from the device not by cleaving, but instead by etching and/or grinding/polishing. (For example, see the label "Grinding/Selective Etching" in Figure 5). Thus, Sarma does not actually teach what the Office Action says it does. Accordingly, since the indicated portion of Sarma does not teach what the Office Action says it does, it is respectfully submitted that Sarma fails to fulfill its intended role in the §103 rejection, and that the §103 rejection is therefore defective. For this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by the proposed combination of Sarma and Henley.

THE PRIOR ART MUST TEACH ALL CLAIM LIMITATIONS UNDER §103

The provisions of MPEP §2142 state that that:

To establish a *prima facie* case of obviousness, . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations.

As discussed above, neither Sarma nor Henley appears to disclose certain limitations that are expressly recited in Claim 11, including the limitations from Claim 11 that have been quoted above. Accordingly, the §103 rejection fails to establish obviousness because, even when the indicated teachings are combined, they fail to satisfy the requirement that they must collectively "teach or suggest all the claim limitations" (emphasis added), as required by §103 and MPEP

§2142. For this independent reason alone, Claim 11 is believed to be patentably distinct from Sarma and Henley, and notice to that effect is respectfully requested.

THE COMBINATION OF REFERENCES IS IMPROPER

There is yet another independent and compelling reason why the teachings drawn from Sarma and Henley cannot properly be combined under §103 to reject Claim 11. In this regard, and as mentioned above, MPEP §2142 provides that:

To reach a proper determination under §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. . . . Knowledge of applicant's disclosure must be put aside in reaching this determination, . . . impermissible hindsight must be avoided, and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

In addition, MPEP §2143.01 provides that:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.
(Emphasis in original).

Here, there would be no motivation for a person of ordinary skill in the art to combine Sarma and Henley in the proposed manner, because neither Sarma nor Henley appears to have any teachings at all that would suggest the use of differing lattice constants to facilitate a separation of two

layers. Therefore, the §103 rejection of Claim 11 is incomplete, because it does not properly establish the required motivation for combining Sarma and Henley in the proposed manner. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 11 is not rendered obvious under §103 in view of Sarma and Henley, and notice to that effect is respectfully requested.

In view of the various different reasons discussed above, it is respectfully submitted that Claim 11 is not rendered obvious under §103 by Sarma and Henley. Claim 11 is thus believed to be allowable over Sarma and Henley, and notice to that effect is respectfully requested.

Independent Claim 20

The limitations of independent Claim 20 include a recitation of:

providing a first wafer having a first semiconductor layer of
a first natural lattice constant;

forming a second semiconductor layer with a second
natural lattice constant on the first semiconductor layer, and
thereby forming an interface with a large strain gradient; . . . and

directing a pressurized fluid jet at said strain gradient so
that said second semiconductor layer is separated from said first
semiconductor layer and said first wafer.

Independent Claim 20 stands rejected under 35 USC §103 as obvious in view of a proposed combination of teachings from Sarma and Henley. This ground of rejection is respectfully traversed. The rationale provided in the Office Action for the rejection of Claim 20 is the same rationale provided for the rejection of Claim 11. Therefore, for the same basic reasons discussed above in association with Claim 11, it is respectfully submitted that Claim 20

is not rendered obvious under §103 by Sarma and Henley. Claim 20 is thus believed to be allowable over Sarma and Henley, and notice to that effect is respectfully requested.

Dependent Claims

Claims 2-10, Claims 12-19 and Claims 21 and 23 respectively depend from Claim 1, Claim 11 and Claim 20, and are also believed to be distinct from the art of record, for example for the same reasons discussed above with respect to Claims 1, 11 and 20, respectively.

Conclusion

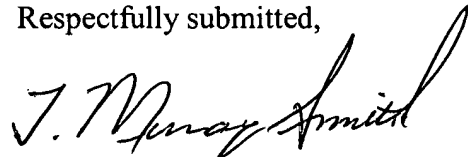
Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way

Appl. No. 10/068,928
Reply to Office Action of December 15, 2004

Attorney Docket No. 2001.1379/24061.421
Customer No. 42717

by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "T. Murray Smith", written in a cursive style.

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Enclosures: Petition for Time Extension, with enclosure
Second Information Disclosure Statement, with enclosures
Acknowledgment Post Card

R-95753.1